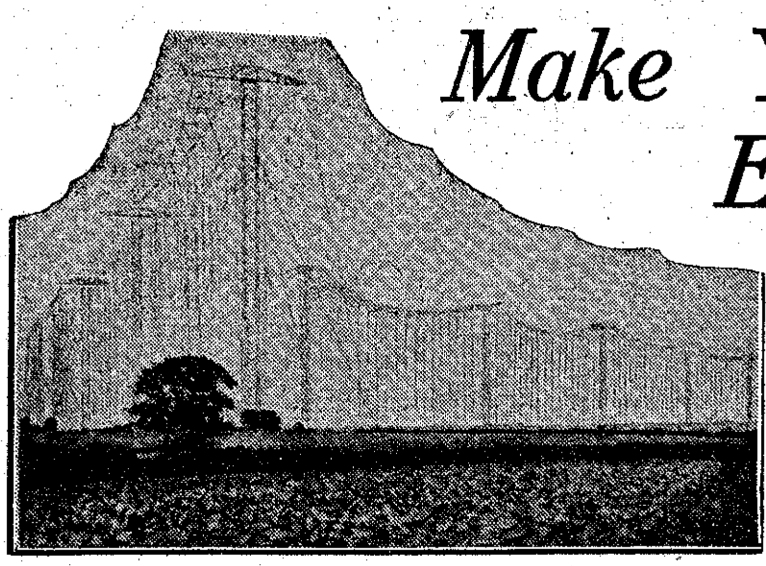

# *Make Your Aerial Fully Efficient*

## *An account of the types of aerials and hints in choosing and erecting*

IF one were to remark to every second owner of a wireless installation, "You are losing strength because your aerial is not as efficient as it might be," he would be decidedly unpopular, but nevertheless substantially correct. Many, of course, will reply, "I am satisfied, and do not propose to interfere with my installation." To them all we can say is do not read a word more of this talk, but concentrate the programmes of the local station.

We all know the purpose of an aerial—to collect energy from the transmitting station. This energy is very weak, thousands of times weaker than that for the smallest radio battery, and effort is made to collect as much as possible. The more that is collected the more can be amplified by the wireless set, hence it follows that the more efficient the system the greater the volume.

**The Importance of Height.**

THE earth is not a good conductor of wireless waves, with the result that the strongest waves are not near the ground. This brings us to the first requirement of the ideal aerial—height. In every set there is a coil and a condenser that are used to bring the set into "reasonance" with the incoming waves. The waves with which the set resonates are those received. It is this fact that makes separation of stations possible. The condenser is a combination of fixed and moving plates electrically disconnected. This is shown in Fig. 1, designated "tuning capacity."

A moment's thought will disclose the fact that the aerial and the earth are in reality one great condenser, and being "in parallel" with the tuning condenser, the total capacity will be that of both. If the aerial to earth capacity is great, the tuning of the aerial system will be affected, and the set is affected. Especially is this of importance where the modern single control receiver is used, where, contrary to general belief, a more efficient aerial system is necessary than with the older two-dial receivers. The capacity of an elevated aerial might be considered to be roughly .0002 mfds. but a low one may approach .0004, a value sometimes greater than the tuning capacity.

Signals will pass through a large capacity, and not through the detector. If the aerial is near an earthed object such as a tree, roof, damp wall, etc., the capacity to earth will be increased, and there will be losses which will be more apparent in wet weather.

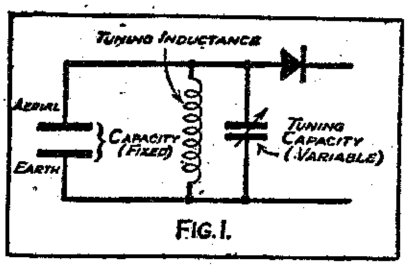


FIG. I.

We have arrived at the first asset of a good aerial—it must be high and clear of all earthed objects.

Height is probably the most important consideration in erecting an aerial system. Unfortunately it is generally the most difficult to obtain, for the erection of tall masts is not as simple as it may appear. The optimum height is 40 feet. Beyond this the signal strength does not increase in proportion to the increased height. Below this there is a rapid decrease in strength for every foot descended, and tuning becomes flatter. The reasons have been made clear in the text referring to the condensers.

**Aerial Length.**

HAVING decided that the aerial is to be no less than 40 feet high, let us examine the next important consideration—length. This depends upon the type of receiver to be used, bearing in mind that the greater the length up to three times the height the stronger the signals. With the large sets using several stages of radio amplification, the aerial should be short, otherwise the capacity to earth will be increased and the aerial circuit thrown out of resonance. The losses from this factor result in a flatter signal (unselective) and a weaker one through not enabling the set to resonate. The accompanying table gives some indication of the length for the different types of sets.

With a crystal or a small valve set where only the local station is desired, a long aerial should be employed, where possible—100 to 150 feet.

Three valves using reaction will find 100 to 120 feet quite sufficient, but the wave trap will be needed if the local station is to be passed.

Four valves with one stage [illegible] radio amplification, 80 to 100 feet.

Five and more valves will find 60 to 75 feet ample.

These figures include the lead-in.

According to a recent authority, the most effective aerial is one with a lead and aerial in the relation of 7 to 3. Roughly the mast is twice as high as the aerial is long. A fifty-foot mast and a 25-foot aerial make a good combination.

**Directional Effect.**

RECENT experiments have shown that for the multi-valve set directional effect is not important, and only when the set is so small that the relation of height to length is 1 to 3 can the effect of direction be appreciated. That is to say, that with a 40-feet mast the aerial should be 120 feet, but as we have already shown such a system cannot be successfully employed on the multi-valve receiver. A directional aerial is of most value to the owner of the crystal or small valve set that is capable of receiving only the local station. The free end should point away from the transmitting station. This naturally refers only to the inverted L aerial, which is the most successful. If conditions do not allow its erection, the T type with the lead-in coming from the centre is used. It is important, however, to see that the lead comes from the exact centre.

**Insulation.**

THIS is where most installations fail. The insulators are frequently not put on correctly, with the result that they break under strain, and a makeshift is used until the aerial can receive attention, which is usually a considerable time. Diagram 2 represents a well insulated system, and the inset shows clearly the method em[illegible]d in coupling insulators. Note the endless halyard passing over the pulley attached to the masthead. If a single halyard is used and the aerial breaks near the mast, or if the rope sticks in the pulley, the mast may have to be lowered (or climbed!).

Two or three small insulators are preferable to one large one, and all insulators should be secured in such a way that if one breaks the wires themselves hold and prevent the aerial from falling. At the "house end," the aerial is secured to a distance piece, which may be of aerial wire, and this in turn is secured to a galvanised iron band (say of 1½-inch by 1-16-inch section), bolted round the chimney above a convenient projecting ledge. The distance piece, or spacing wire, keeps the down-lead away from the roof-gutter and walls of the house, and, as shown, is insulated from the aerial and from the